

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A magnetron plasma processing apparatus for
subjecting a target substrate to a magnetron plasma process, which comprising:

a chamber with an outer wall that can maintain reduced pressure;

a pair of electrodes arranged in said chamber to oppose each other and to define a
processing space therebetween;

process gas supply means for supplying a process gas into said chamber;

electric field forming means for applying a voltage to said pair of electrodes, thus
forming an electric field in the processing space; and

magnetic field forming means for forming, in the processing space, a magnetic field
perpendicular to a direction of the electric field and directed in one direction, wherein ~~a target~~
~~substrate is subjected to a magnetron plasma process while~~ the target substrate is set in the
processing space to be parallel to said electrodes,

said magnetic field forming means including a dipole ring magnet comprising:

a plurality of first anisotropic segment magnets arranged in a ring-like shape
around the outer wall of said chamber so as to form a magnetic field gradient, in a
plane perpendicular to the direction of the electric field, such that a magnetic field
strength is large and small on upstream and downstream sides, respectively, in an
electron drift direction ~~along a direction~~ perpendicular to a direction of the magnetic
field,

~~at least one~~ one or more adjoining second anisotropic segment magnet
magnets[[,]] arranged ~~in the vicinity of proximate~~ to a predetermined region, the
predetermined region being located outside that end of the target substrate which

is on ~~[[an]]~~ the upstream side in the electron drift direction, the second anisotropic segment magnets having ~~[[with]]~~ an N pole thereof being directed toward the predetermined region and a net magnetic force being directed radially toward the center of the dipole ring magnet, and

~~at least one~~ one or more adjoining third anisotropic segment ~~magnet magnets~~ arranged ~~in the vicinity of proximate to~~ the predetermined region, the third anisotropic segment magnets having ~~[[with]]~~ an S pole thereof being directed toward the predetermined region and a net magnetic force being directed radially away from the center of the dipole ring magnet,

said second and third anisotropic segment magnets serving to locally increase a magnetic field strength of the predetermined region, such that the magnetic field strength of the predetermined region is ~~[[to be]]~~ larger than ~~[[that]]~~ a magnetic field strength contributed ~~formed~~ by said first anisotropic segment magnets alone.

Claim 2 (Original): A magnetron plasma processing apparatus according to claim 1, wherein said second and third anisotropic segment magnets are disposed in a ring-like shape together with said first anisotropic segment magnets.

Claim 3 (Original): A magnetron plasma processing apparatus according to claim 2, wherein said second and third anisotropic segment magnets are arranged continuously.

Claim 4 (Original): A magnetron plasma processing apparatus according to claim 3, wherein said first to third anisotropic segment magnets are columnar magnets of the same strength which are magnetized in one direction, and said first

anisotropic segment magnets are arranged such that directions of magnetization thereof are slightly shifted from each other.

Claim 5 (Original): A magnetron plasma processing apparatus according to claim 4, wherein said first anisotropic segment magnets are arranged such that gaps among those which are on the upstream side in the electron drift direction are narrower than gaps among those which are on the downstream side in the electron drift direction.

Claim 6 (Original): A magnetron plasma processing apparatus according to claim 1, wherein said first anisotropic segment magnets form a magnetic field with 200 Gauss at maximum at a portion thereof opposing the target substrate, and said first to third anisotropic segment magnets form a magnetic field of at least 200 Gauss at the predetermined region.

Claim 7 (Currently Amended): A magnetron plasma processing apparatus
for subjecting a target substrate to a magnetron plasma process, comprising:

a chamber which has an outer wall and can maintain reduced pressure;
process gas supply means for supplying a process gas into said chamber;
a pair of electrodes arranged in said chamber to oppose each other and to define a processing space therebetween;

electric field forming means for applying a voltage to said pair of electrodes, thus forming an electric field in the processing space; and

magnetic field forming means for forming, in the processing space between said pair of electrodes, a magnetic field perpendicular to a direction of the electric field and directed in one direction, wherein ~~a target substrate is subjected to a magnetron plasma~~

~~process while~~ the target substrate is set in the processing space to be parallel to said electrodes,

said magnetic field forming means including a dipole ring magnet comprising:

a ~~large number~~ plurality of anisotropic segment magnets arranged in a ring-like shape around the outer wall of said chamber, to form a gradient of the magnetic field, in a plane perpendicular to the direction of the electric field between said electrodes, such that a ~~strength of the~~ magnetic field strength is large and small on upstream and downstream sides, respectively, in an electron drift direction ~~along a direction~~ perpendicular to a direction of the magnetic field[[,]]; ~~said plurality of anisotropic segment magnets including~~

a first section ~~comprising at least one~~ of one or more adjoining anisotropic segment ~~magnet magnets~~ arranged ~~in the vicinity of~~ proximate to a first region, said first region located outside that end of the ~~process target~~ substrate which is on the upstream side in the electron drift direction, said first section having [[with]] an N pole thereof being directed toward the first region and a net magnetic force being directed radially toward the center of the dipole ring magnet; [[,]] and

a second section ~~comprising at least one~~ of one or more adjoining anisotropic segment ~~magnet magnets~~[[,]] arranged ~~in the vicinity of~~ proximate to a second region, the second region located outside that end of the target substrate which is on the upstream side in the electron drift direction, ~~to be away from the first region;~~ said second section having [[with]] an S pole thereof being directed toward the second region and a net magnetic force directed radially from the center of the dipole ring magnet,

the first and second sections serving to locally increase magnetic field strengths of the first and second regions, such that the magnetic field strengths of the

first and second regions are larger than the corresponding magnetic field strengths contributed by said plurality of anisotropic segment magnets alone.

Claim 8 (Original): A magnetron plasma processing apparatus according to claim 7, wherein at least another anisotropic segment magnet is arranged between the first and second sections.

Claim 9 (Original): A magnetron plasma processing apparatus according to claim 8, wherein said anisotropic segment magnets are columnar magnets of the same strength which are magnetized in one direction, and those of said anisotropic segment magnets which are at a portion other than the first and second portions are arranged such that directions of magnetization thereof are slightly shifted from each other.

Claim 10 (Original): A magnetron plasma processing apparatus according to claim 9, wherein first anisotropic segment magnets are arranged such that gaps between those which are on the upstream side in the electron drift direction are narrower than gaps between those which are on the downstream side in the electron drift direction.

Claim 11 (Original): A magnetron plasma processing apparatus according to claim 7, wherein said anisotropic segment magnets form a magnetic field with 200 Gauss at maximum at a portion thereof opposing the target substrate, and form a magnetic field of at least 200 Gauss at the predetermined region.

Claim 12 (Currently Amended): A magnetron plasma processing apparatus for subjecting a target substrate to a magnetron plasma process, comprising:

a chamber to which a process gas is to be supplied;

a pair of electrodes arranged in said chamber to oppose each other and to define a processing space therebetween;

electric field forming means for applying a voltage to said pair of electrodes, thus forming an electric field in the processing space; [[and]]

first magnetic field forming means for forming, in the processing space between said pair of electrodes, a first magnetic field perpendicular to a direction of the electric field and directed in one direction, the magnetic field having, at a portion other than that end of a target substrate which is on an upstream side in an electron drift direction, a magnetic field gradient, within a plane perpendicular to the direction of the electric field between said electrodes, such that a magnetic field strength of the first magnetic field is large and small on the upstream and downstream sides, respectively, in the of the chamber in an electron drift direction along a direction perpendicular to a direction of the magnetic field, the magnetic field strength being locally large at that end on the upstream side, said magnetron plasma processing apparatus serving to subject the substrate to a magnetron plasma process while the target substrate is set in the processing space to be parallel to said electrodes; and

second magnetic field forming means for increasing a magnetic field strength at one or more predetermined regions, the predetermined regions located proximate to and outside of that end of the target substrate on the upstream side in the electron drift direction,

the first and second magnetic field forming means forming a maximum magnetic field strength of 200 Gauss above the target substrate and a minimum magnetic field strength of 200 Gauss at the predetermined regions.

Claim 13 (New): A magnetron plasma processing apparatus for subjecting a target substrate to a magnetron plasma process, comprising:

a chamber to which a process gas is to be supplied;

a pair of electrodes arranged in said chamber to oppose each other and to define a processing space therebetween;

electric field forming means for applying a voltage to said pair of electrodes, thus forming an electric field in the processing space;

first magnetic field forming means for forming, in the processing space between said pair of electrodes, a first magnetic field perpendicular to a direction of the electric field and directed in one direction, such that a magnetic field strength of the first magnetic field is large and small on upstream and downstream sides, respectively, in an electron drift direction perpendicular to a direction of the first magnetic field; and

second magnetic field forming means for increasing a magnetic field strength at one or more predetermined regions, the predetermined regions located proximate to and outside that end of the target substrate which is on the upstream side in the electron drift direction,

the first and second magnetic field forming means forming an overall magnetic field gradient, such that the magnetic field strength of the overall magnetic field gradient increases by more than 500 Gauss over a range of 150mm to 250mm from the center of the first magnetic field forming means along the electron drift direction.